

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

REMARKS

In the Office Action, the Examiner reviewed claims 1-9, 11, and 12 of the above-identified US Patent Application, with the result that claims 1-9, 11, and 12 were rejected under 35 USC §102 in view of three prior art references cited in the previous Office Action (filed March 18, 2004; Paper No. 030904).¹ In response, Applicants have amended the specification to correct a typographical error and have amended independent claims 1 and 8 to incorporate the limitations of their respective dependent claims 5 and 9. Applicants believe that these amendments do not present new matter, and that the claim amendments strictly comply with 37 CFR §1.116(a) as being limited to reducing and simplifying the issues remaining in the examination of Applicants' application, namely, the cancellation of dependent claims and incorporation of their subject matter into their respective parent claims. Consequently, Applicants believe that the above amendments do not raise new issues that would require further consideration and/or search by the Examiner, and place the claims in better condition for appeal. MPEP §714.13.

Favorable reconsideration and allowance of remaining claims 1-4, 6-8, 11 and 12 are respectfully requested in view of the above amendments and the following remarks.

¹ Applicants previously canceled claim 10 in their Amendment filed June 18, 2004. Each of the 35 USC §102 rejections incorrectly identifies canceled claim 10 as being rejected.

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

Rejections under 35 USC §102

Independent claims 1 and 8 and their remaining dependent claims 2-4, 6, 7, 11 and 12 were rejected for a second time under 35 USC §102 as being anticipated by U.S. Patent No. 6,004,620 to Camm et al. (Camm), EP 1103627A2 to Farmer et al. (Farmer), and U.S. Patent No. 6,368,060 to Fehrenbach et al. (Fehrenbach). Applicants respectfully request reconsideration of these rejections in view of the following comments.

Applicants' independent claims 1 and 8 recite a component (10) having a coating (20) on a first surface (14) thereof and a machined through-hole (12) from which a coating deposit (22) has been removed so that the through-hole (12) has a first through-hole surface defined by the component (10) and a second through-hole surface defined by the portion of the coating (20) exposed by removal of the deposit (22). Claims 1 and 8 require that the first through-hole surface (defined by the component 10) is impact-flattened and that the second through-hole surface (defined by the coating 20) is deburred and smoothed primarily by impact fracturing of the deposit (22) and not by erosion or abrasion of the deposit (22).

Applicants teach that a through-hole (12) having the above-identified structural limitations is obtained with a non-abrasive water jet treatment in which a non-abrasive media is entrained. At paragraphs [0034] through [0039], Applicants report

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

comparative testing in which holes blocked by coatings were treated with a nonabrasive media-containing water jet in accordance with Applicants' claims 1 and 8, as well as with media-free water jets at pressures between about 11,000-40,000 psi and abrasive-containing water jets at pressures between about 60 and 80 psi.

Camm and Farmer were cited as treating a cooling hole with a media-free water jet, while Fehrenbach was cited as treating a cooling hole with a water jet that may contain an abrasive grit. Applicants' position in their previous response (filed June 18, 2004) was that water jet treatments performed by these references would not result in holes with the structural limitations (surface characteristics) recited in claims 1 and 8, but instead would result in holes with characteristics described in paragraph [0038] and shown in Figures 5 and 6. The Examiner's response was that "[t]he comparative testing performed by applicant is not commensurate with the methods used by [Camm, Farmer, and Fehrenbach]." Unfortunately, the Office Action does not explain in what manner Applicants' comparative testing was not commensurate with any of these references.

Camm

The basis for the Examiner applying Camm as an anticipating reference was simply that

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

Camm teaches a method of unblocking an obstructed cooling passage. Application of coating (28) often results in an undesirable accumulation (30) of the coating material within and over the cooling holes (16). Using a high-pressure water jet (38), water is directed at the hole at a pressure between about 10,000-60,000 psi. This results in substantially no machining of the metal of the uncoated exterior surface of the walls (44).

Unstated but understood is that Camm's water jet (38) does not contain media.

At paragraph [0034] of their specification, Applicants disclose a comparative test performed with high-pressure, media-free water jets directed at holes at pressures between about 11,000-40,000 psi to remove undesirable accumulation of coating material within and over the holes. Figure 6 depicts the appearance of one of the holes treated with a high-pressure media-free water jet at a pressure of 40,000 psi. Applicants have searched Camm yet found no teaching by Camm that the pressure of the water jet has any particular effect on the ability to remove a coating from a hole or has any particular effect on the surface finish of the treated hole. Consequently, it must be presumed that all pressures within Camm's disclosed range of 10,000 to 60,000 psi will achieve the object of Camm's invention - "machin[ing] away, by particle erosion, the coating accumulation 30 within the cooling hole 16" (column 6, lines 19-21).

Because Camm expressly teaches the coating accumulation 30 is removed by erosion, and Applicants' claims expressly exclude erosion as the process by which the second through-hole surface (defined by the coating 20) is formed, Applicants believe

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

that Camm does not anticipate Applicants' claims.

In any event, with nothing in the record to refute the conclusion that all pressures within Camm's disclosed range of 10,000 to 60,000 psi will have the same desired effect, it is reasonable to conclude that Applicants' test results using a media-free water jet at 40,000 psi is representative of results that would be obtained for media-free water jets at pressures anywhere within the 10,000 to 60,000 psi range taught by Camm. Therefore, Applicants believe that it is improper for the Examiner to conclude that the comparative testing performed by Applicants is not commensurate with the methods used by Camm, at least in view of the limited grounds on which the Examiner concluded that Camm anticipates Applicants' claims.

Farmer

A very similar situation exists for each of the remaining rejections based on Farmer and Fehrenbach. The basis for the Examiner's conclusion that Farmer anticipates Applicants' claims was that Farmer discloses "a fluid jet substantially free of solid particles is used at a pressure of between about 5000 to about 50,000 psi." Farmer teaches that "the water jet pressure may vary without departing from the scope of the present invention," which is to remove a ceramic coating from a hole (column 6, lines 15-17). Consequently, it must be presumed that all pressures within Farmer's disclosed range of 5,000 to 50,000 psi will achieve the object of Farmer's invention -

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

“abrad[ing] the bond coat 60 [or ceramic coating 70] rather than pushing it from the hole” (column 6, lines 10-21; column 7, lines 1-3).

Because Farmer expressly teaches removal of the bond coat 60 and ceramic coating 70 is by abrasion, and Applicants’ claims expressly exclude abrasion as the process by which the second through-hole surface (defined by the coating 20) is formed, Applicants believe that Farmer does not anticipate Applicants’ claims.

In any event, without evidence offered by the Examiner to the contrary, it appears that the comparative testing performed by Applicants with high-pressure media-free water jets at pressures between about 11,000-40,000 psi to remove undesirable accumulation of coating material within a hole (paragraphs [0034] through [0039]; Figure 6) is also commensurate with the methods used by Farmer, at least in view of the limited grounds on which the Examiner concluded that Farmer anticipates Applicants’ claims.

Fehrenbach

Finally, the Examiner concluded that Fehrenbach anticipates Applicants’ claims on the basis of disclosing “a high-pressure fluid stream . . . is targeted at the hole and is pressurized to at least about 200 bar [about 2900 psi], and may contain an abrasive grit.” It appears that comparative testing performed by Applicants and reported at paragraphs [0037] and [0038] and shown in Figure 5 is at least indicative of

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

the results that are obtained by methods used by Fehrenbach, at least in view of the limited grounds on which the Examiner concluded that Fehrenbach anticipates Applicants' claims. In particular, if an abrasive water jet at 60 to 80 psi resulted in an irregular hole surface (paragraph [0038]), so would an abrasive water jet at Fehrenbach's pressures (at least 2900 psi) since the cutting action is enhanced - not diminished - by Fehrenbach's higher pressures. While Fehrenbach teaches that "smooth transitions (i.e., surfaces free of irregularities and discontinuities) can be achieved within the cooling hole 22 and opening 24 using a high-pressure fluid stream" (column 5, lines 46-50), it should be understood that Fehrenbach is viewing the smoothness of the cooling hole 22 from a macroscopic scale, since it is clear from Applicants' teachings that Fehrenbach's process entails machining the hole 22 and not merely removing coating from a pre-existing hole (column 6, lines 1-3). In any event, whether Fehrenbach's water jet is media-free or contains abrasives, the resulting hole surfaces would undeniably differ in appearance from that claimed by Applicants (compare Applicants' Figures 5, 6, and 7).

Because of the insufficiency of the explanation in the Office Action as to why "[t]he comparative testing performed by applicant is not commensurate with the methods used by [Camm, Farmer, and Fehrenbach]," Applicants are prevented from presenting any further response to this issue. Applicants respectfully request

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

withdrawal of the finality of the Office Action to provide both the Examiner and Applicants an opportunity to clarify the above issue, as would be necessary for purposes of appeal or the filing of a continuation application.

As a final issue, under each of the rejections the Examiner also stated that “the means by which the smoothness is accomplished is not considered to structurally define over the prior art.” However, Applicants respectfully disagree, because the means by which the smoothness is accomplished directly determines the resulting structure of the treated surface, and claims 1 and 8 expressly claim the resulting surface structure, e.g., “the first through-hole surface is impact-flattened . . . , the second through-hole surface is deburred and smoothed primarily by impact fracturing of the deposit and not by erosion or abrasion of the deposit,” That different surface structures will result from different “means by which the smoothness is accomplished” is self-evident from comparing the processes in question - media-free water jet (Camm, Farmer, and Fehrenbach) versus abrasive water jet (Fehrenbach) versus a nonabrasive media-filled water jet (Applicants) - and is corroborated in Applicants’ specification at paragraphs [0006], [0008], [0019], [0021], [0022], and [0038] and Figure 5 (abrasive-containing water jets), paragraphs [0022], [0036], [0038], and [0039] and Figure 6 (media-free water jets), and paragraphs [0019], [0021], [0037], and [0039] and Figures 7 and 8 (non-abrasive media-containing water jets). The meaning of the terms “impact-

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

flattened” and “impact fracturing” should not be in dispute, since surfaces having these structural limitations are shown in Figures 7 and 8 - and are contrasted with holes treated with media-free water jets (Figure 6, e.g., Camm, Farmer, and Fehrenbach) and abrasive water jets (Figure 5, e.g., Fehrenbach).

In view of the above, Applicants believe that “the means by which the smoothness is accomplished” does serve to structurally define over the prior art, since the means has been shown to determine what surface characteristics will be present within a treated hole.

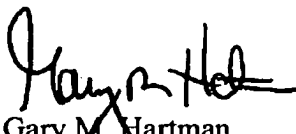
For all of the above reasons, Applicants respectfully request favorable reconsideration of the rejections under 35 USC §102. Alternatively, Applicants respectfully ask that the Examiner withdraw the finality of the rejection and provide an explanation as to why “[t]he comparative testing performed by applicant is not commensurate with the methods used by [Camm, Farmer, and Fehrenbach].”

Application No. 10/605,241
Docket No. 121441-7
Amendment dated November 9, 2004
Reply to Office Action of September 9, 2004

Closing

Should the Examiner have any questions with respect to any matter now of record, Applicants' representative may be reached at (219) 462-4999.

Respectfully submitted,

By 
Gary M. Hartman
Reg. No. 33,898

November 9, 2004
Hartman & Hartman, P.C.
Valparaiso, Indiana 46383
TEL.: (219) 462-4999
FAX: (219) 464-1166